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ABSTRACT

The role of equity in determining how higher education should be supported is considered, along with several approaches for measuring benefits and costs of public subsidies, and conclusions from the literature. Attention is directed to equity in financing higher education because higher education is often advocated as a mechanism for providing equality of opportunity. Subsidies might be considered equitable if they lead to a more equal distribution of lifetime income or enhance social mobility over time. Several studies are examined, including those of W. Lee Hansen and Burton Weisbrod (1969) and of John Conlisk (1977). The private benefits of subsidies and costs and the net result of combining costs and benefits are examined. It is suggested that the ideal measure of equity, the effect of the subsidies on lifetime incomes, cannot be approximated with existing data. An alternative method used in most of the literature--the net benefit approach--has generally produced the finding that subsidies do redistribute current income from rich toward poor, but conceptual and technical problems make the conclusions and usefulness of this method unreliable as a measure of equity. Another approach, to examine the equity of the benefits and costs separately, suggests that current tuition subsidies are not equitably financed and have not succeeded. The policy question of whether a strategy such as tuition, that rises with income, would be equitable has not yet been answered. (SW)

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THE EQUITY OF PUBLIC SUBSIDIES FOR HIGHER EDUCATION: SOME THOUGHTS ON THE LITERATURE

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THE EQUITY OF PUBLIC SUBSIDIES FOR HIGHER EDUCATION: SOME THOUGHTS ON THE LITERATURE

I. INTRODUCTION

Quite often when economists are asked to make a value judgement, they will answer only, it depends. This paper is no exception, although the authors of the literature on which it draws have been remarkably eager to pronounce either for or against current public subsidies of higher education on equity grounds. From its position of nonalignment, this paper attempts to clarify issues in the debate by analyzing some of the factors on which a judgement about equity depends, discussing a number of different approaches that have been taken, and suggesting some further analyses.

Much of the confusion in the literature on the equity of public subsidies stems from disagreement on the existence and magnitude of public benefits from higher education, an efficiency question that should remain distinct from a determination of equity. Equity considerations must be balanced subjectively against efficiency concerns. Since arriving at a desirable method of financing higher education is the ultimate goal of analyzing the equity of public subsidies, Section II of this paper discusses the role of equity in determining how higher education should be supported as the background against which conclusions on equity should be viewed.

Factual questions on the distribution of benefits and costs of public subsidies are analyzed next. Section III through V examine conclusions that the literature has reached and methods by which it has handled such considerations as the following: Should equity relate to the distribution of current subsidies or to their effect on lifetime incomes? How should the intergenerational nature of the subsidies be treated? What are the implications of one segment

of the population benefiting substantially (students) while most people (nonstudents) receive no direct benefits? How should the costs be allocated among taxpayers -- what is the correct tax incidence and which tax dollars are the ones that support higher education? Should benefits and costs be combined to produce a measure of net benefits and to suggest the income redistributional effect of subsidies, or should they be examined separately? All of these questions are relevant for government support of higher education in general, but this paper will concentrate only on state and local subsidies for public higher education. State aid to the private sector or federal programs raise additional complicating issues that would be better analyzed separately.

The final section draws together the theoretical discussion of Section II with the analysis of the studies examined in Sections III through V. As often happens, the ideal measure of equity -- in this case, the effect of the subsidies on lifetime incomes -- cannot even be approximated with existing data. An alternative method used in most of the literature -- the net benefit approach -- has generally produced the finding that subsidies do redistribute current income from rich toward poor. This method has serious conceptual and technical problems, however, that make its conclusions unreliable and its usefulness as a measure of equity doubtful. A third approach -- simply to examine the equity of the benefits and costs separately -- suggests that current tuition subsidies are not equitably financed and have not succeeded in equalizing educational opportunities. The important policy question -- whether an alternative financing strategy, such as tuition that rises with income, would be more successful in equity terms -- has yet to be answered, much less the broader question of the proper balance (if there is one) between equity and efficiency.

II. THE ROLE OF EQUITY IN FINANCING HIGHER EDUCATION

Equity can be defined in a number of ways. Economist frequently distinguish between "horizontal" and "vertical" equity, treating equals equally and treating unequals in some appropriately unequal manner. Subsidies for higher education merit attention for three primary reasons that essentially reflect alternate ways to judge the vertical equity of the subsidies.

First, higher education is often advocated as a mechanism for providing general equality of opportunity for financial success in life, for promoting a "fair race," although, as Authur Okun has noted, "it is hard to find the starting line" (1975, p. 76). In this context, the subsidies might be considered equitable if they lead to a more equal distribution of lifetime income among the population, or if they enhance social mobility over time. Secondly, apart from equalizing lifetime outcomes, there is much concern with providing equality of educational opportunity. Subsidies would be viewed as equitable, then, if they equalize educational opportunities by concentrating on low rather than on high income students. Finally, even though the relationship between the distribution of subsidies and the distribution of lifetime incomes is extremely difficult, if not impossible, to determine, there is a general concern that as much of public spending as possible contribute to a more equal distribution of income among the population as a whole, or at least not redistribute current income from poor to rich. The literature has approached these questions in a variety of ways, but as later sections of this paper will discuss, the verdict has yet to arrive on the vertical equity of subsidies for higher education, in part because these three interpretations of equity may produce conflicting conclusions for a given situation.

In terms of horizontal equity, subsidies for public higher education appear to be inequitable since within a given income group, only those attending college receive any subsidy while the others pay taxes to finance it. This is very common, though, when government provides services rather than cash grants. Public housing is a classic example of a program that clearly redistributes income from the affluent to the low income classes, but since only a few of the poor benefit, there is also redistribution within the low income groups from nonusers to users (See, for example, Barton and Olsen, 1976). With higher education, horizontal equity is further complicated by two kinds of nonusers: those of traditional college age and those who are older. The literature on the equity of subsidies deals with this intergenerational problem in different ways, some considering only potential student as relevant while others compare all nonusers to users.

A conclusion on the equity of current subsidies cannot alone determine whether present tuition subsidies are more equitable than alternative financing patterns. Consider first a world that has an unequal distribution of income but that is perfect in all other respects, such as complete information and costless program administration. In this situation, there are no equity grounds for supporting low tuition for everyone because the simple alternative of relating tuition subsidies inversely to income (i.e., need-based student aid in place of low tuition) would be better in terms of vertical equity, though no different in terms of horizontal equity.

Since we do not live in this ideal world but must confront incomplete information, costly program administration, and other imperfections, low tuition for everyone may actually be a more effective way to achieve equity. For example, with high stated tuitions, many low income people might be unaware that they would not have to pay this price and would base their attendance

decisions on it. For whatever reason, it is possible that universal low tuition could be considered more equitable than relying on financial aid alone. Anyone arguing for higher public tuitions on equity grounds must be convinced that income-based subsidies are more equitable than low tuition in practice as well as in theory.

Before proceeding any further with an examination of equity, it is important to emphasize that equity is only one element in any judgement on the appropriateness of a financing pattern. As economists are particularly fond of stressing, both equity and efficiency -- the allocation of resources so that they can generate the greatest value of output, be it tractors or intangible benefits to society -- must be considered. For example, there is little concern over the equity effects of the publicly supported military academies (apart from their not discriminating against low income students, minorities, or women) because the prime function of those subsidies is to train military officers. The academies are different from other institutions of higher education where both social equity and an efficient allocation of resources in the provision of desired externalities are important.

Consider another perfect world, this one characterized by a perfectly equal (or at least acceptable) distribution of income continuing from generation to generation. In this case, tuition subsidies would only be justified on efficiency grounds such as: (a) inducing people to consume more higher education than they otherwise would in order to produce externalities such as research, cultural centers, or enlightened voters and citizens; (b) reducing market imperfections -- such as risk or the inability to evaluate correctly a person's economic returns to higher education -- that cause sub-optimal levels of higher education consumption; (c) extending

payments for a person's own higher education over his whole life and earnings.[1]

In the real world, the magnitude of these social benefits is uncertain, and some even question their existence.[2] Low tuition induces everyone -- rich and poor -- to consume more higher education than they would in the absence of the subsidies. There certainly is no way to quantify the public benefits of this additional consumption. Moreover, public subsidies of higher education are aimed at furthering both efficiency and equity. A policy that can produce gains in either without reducing the other is most desirable but also rare. Too often, the two goals conflict, requiring a tradeoff between them. Okun has called it "our biggest tradeoff (which) plagues us in dozens of dimensions of social policy. We can't have our cake of market efficiency and share it equally" (1975, p. 2). The problem is to determine where the compromise should be set. There is no right answer and no universal answer. Normative and political judgements, not economic arguments, are determinative.

Economic evidence, however, can contribute to those judgements. A number of studies, starting with the most well-known by W. Lee Hansen and Burton Weisbrod (1969) and continuing through a theoretical contribution by John Conlisk

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[1]This goal could also be accomplished through a "Yale Plan" type of loan where the student's repayments depend on his income. For a discussion of the Yale Plan and other loan programs, see Robert W. Hartman, "Equity Implications of State Tuition Policy and Student Loans," Journal of Political Economy, Supplement, May/June, 1972.

[2]"Our apparent skepticism about either the existence or significance of some of the widely discussed external benefits from higher education stems principally from the absence of any substantial body of evidence in support of them. Indeed, much of the so-called evidence is anecdotal in nature. We do not, however, wish to assert that external benefits do not exist; only that they are elusive and demanding of a great deal of hard attention" (Hansen and Weisbrod, 1969, p. 40).

(1977) have examined the equity of public subsidies for higher education. (Table 1 lists those studies and briefly compares their approaches and conclusions.) The next three sections of this paper analyze the evidence these works have presented. Section III examines the private benefits of the subsidies, Section IV the costs, and Section V the net result of combining costs and benefits.

III. THE PRIVATE BENEFITS OF PUBLIC SUBSIDIES FOR HIGHER EDUCATION

The two basic questions that need to be answered in an examination of the private benefits of the subsidies are (1) who the beneficiaries are, and (2) how much benefits different groups receive. The first question is one of access to public higher education and relates to the distribution of opportunities. The second involves calculating the value of the subsidies received, either in terms of the value to the government of its expenditures (the input approach) or in terms of the value to the students in added lifetime income (the output approach). Before seeing how those two questions have been answered, some discussion is in order on the income measures on which the studies are based.

Even though family income is used to categorize students in all the empirical studies in this literature, there are serious problems associated with its use, namely its relevance and its reliability. First, a measure that included net wealth and nonmonetary income, as well as current income, would be a more accurate indicator of economic well-being or ability to pay, but such a measure is unavailable for the student population as a whole.[3] In addition,

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[3]For a discussion of these and other weaknesses "in both the concepts and the data that underlie standard income distribution analysis," see Irwin Garfinkel and Robert Haveman, "Economic Inequality and the Utilization of Earnings Capacity," Institute for Research on Poverty, Discussion Paper 300-75, August 1975.

Table 1. A Brief Comparison of Studies on the Equity of Public Subsidies for Higher Education

Author and Date	Data	Focus of the Study	Costs	Do Subsidies Improve the Income Distribution?
Hansen & Weisbrod (1969)	California 1964-65	Net benefits for students with the median income at California public universities, state colleges, and community colleges	Total family taxes	No
Windham (1970)	Florida 1967-68	Taxpayer net benefits by income class	Taxes allocated to public higher education	No
Pechman (1970)	Same as Hansen and Weisbrod	Taxpayer net benefits per family in the income class	" " "	Yes-maybe
Zimmerman (1973)	St. Louis 1969-70	Expenditure per full-time-equivalent student at 3 community colleges plus financial aid, minus family taxes; per student basis, by income class	" " "	No-not equalizing
Machlis (1973)	New York City 1968	Taxpayer net benefits by income class	" " "	Yes
Crean (1975)	Canada 1961-62	Income distribution of students and share of tax payments, by income class and age	Distribution of tax payments by income class	Yes
McGuire (1976)	California 1971	Subsidies (including financial aid) by income class	(No cost side)	Not regressive
New Jersey Commission (1976)	New Jersey 1975-76	Taxpayer net benefits by income class, including student aid	N.J. taxes allocated to public higher education	No
Conlisk (1977)	none	Intergenerational model of the determination of income	———	?

the family income figures generally do not apply to independent students. This would tend to bias upwards the income distribution of students since independent students are more likely to come from lower income families who can no longer support them (Machlis, 1973, p. 56; McGuire, 1976).[4] A further criticism of the income figures is the relevance of parents' income at all, since the student -- not the family -- is receiving the education. State and federal governments, as well as most colleges, consider it quite relevant since they base their financial aid programs on parental income, a practice that penalizes students who value their education more highly than do their parents. In the absence of massive amounts of student aid, there is no practical alternative. Even conceptually, it is unclear how a student's ability to pay for his education should be measured without a crystal ball (or a good econometric model) that tells what his lifetime income will be, particularly in light of evidence that economic status is transmitted from generation to generation (Brittain, 1977).

The biggest problem with the income measure is its reliability. In most of the studies, income data were obtained by asking students to estimate their family income rather than asking the parents themselves.[5] The accuracy of this information is doubtful, although if students generally suffer similar

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[4]McGuire was fortunate to have data on parents' income, whether they supported their children or not.

[5]In Zimmerman's study of three community colleges in St. Louis, he tried to avoid this problem by matching parents' detailed occupations as reported by the students with earnings information from the Census Bureau of approximate family income. It is probably correct to assume that children know their parents' occupations better than their earnings, but in view of his small samples (enrollment at the three colleges ranged from 195 to 327) and the weakness of occupation alone as a predictor of earnings, it is doubtful that he succeeded in inproving the accuracy of his income data (Zimmerman, 1973).

misperceptions of their family income, perhaps the distributions of income are better than specific statistics like the median. Even aside from the data's accuracy is the problem of definition. As the Census Bureau has demonstrated, when people are simply asked their income, they consistently underreport, perhaps by as much as 20 to 25 percent, what their total income would be if they were asked separate questions on income from various sources.[6] For the purposes here where income reported by students will be related to tax payments from studies that use various definitions of income (adjusted gross income, taxable income, income after taxes, among others), it is dubious that students are reporting income figures that are comparable to the measures used in the taxation studies.

In spite of these criticisms, the empirical studies on the equity of public support of higher education cannot be faulted for using family income as a base for classifying students. Not only is there no better alternative at present, but family income would probably be highly correlated with any preferable measure of a student's economic well-being that was devised. The questionable accuracy of the data, however, should inhibit comparisons with other income information and should produce enough skepticism about the precision of any results that qualitative rather than quantitative conclusions will be emphasized.

A. Who Benefits?

One way to examine the question of who benefits from public support of higher education is to compare the income distribution of students with that of

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[6] See U.S. Census Bureau, School Enrollment -- Social and Economic Characteristics of Students: October, 1975, Current Population Reports, Series P-20, No. 303, December 1976, p. 67. Using unpublished Census data from the special 1975 Survey of Income and Education (SIE), Froomkin and Andrews have shown that more reliable survey methods would raise income even further. See "Aid to Higher Income Families' Undergraduates," Joseph Froomkin and Richard Andrews (mimeo, 1978), Table 1.

nonstudents. Many of the empirical studies undertook this approach, as can be seen in Table 2 which presents abbreviated versions of those comparisons.[7]

Hansen and Weisbrod (1969) compared students to all families in California, finding that students generally come from the upper end of the income spectrum. How much of this difference is due to "inequities" and how much simply to the fact that parents of college students tend to be at or near the peak of their age-earnings profiles cannot be determined from their comparison. Machlis and McGuire attempted to compensate for this life cycle effect, choosing as their bases families with 18 to 24 year old dependents and families headed by persons aged 35 to 60, respectively.

Machlis' figures for the United States as a whole show that freshmen at public institutions came from families with slightly higher incomes than the general population of college-age dependents, a pattern similar to Hansen and Weisbrod's findings for California.[8] For New York City, the story is different. City University of New York apparently serves disproportionately few upper income students and relatively many low and middle income students. The policy of open admissions instituted in 1970 has undoubtedly lowered the income profile on the campuses even further.

In McGuire's reexamination of California using 1971 data, students attending public colleges and universities reported their parents had substantially lower incomes than did families headed by 35 to 60 year olds, reversing

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[7]Windham's and the New Jersey Commission's comparisons are not shown because in each case, the income for the general population applied to a much earlier year than did student income, limiting the usefulness of the results (Windham, 1970; State of New Jersey Commission on Financing Post-Secondary Education, 1976).

[8]To the extent that low income students have higher attrition rates than their higher income counterparts, the income distribution of all undergraduates should be even higher than that of freshmen.

Table 2. Income Distributions of Students and Comparison Groups

HANSEN AND WEISBROD (1969)	Family income: California, 1964						
	$0-3,999	$4,000-5,999	$6,000-7,999	$8,000-9,999	$10,000-13,999	More than $14,000	Median
Parent-supported students	6.6%	13.0%	17.6%	16.4%	24.6%	21.8%	$9,560
Families without children in California public higher education	17.0	14.9	19.0	18.3	19.4	11.4	7,900
All families	16.1	14.8	18.9	18.1	19.8	12.3	8,000

MACHLIS (1973)	Family income: New York City and United States, 1968						
	$0-3,999	$4,000-5,999	$6,000-7,999	$8,000-9,999	$10,000-14,999	More than $15,000	Median
New York City							
Freshmen in public institutions	7.7%	15.6%	21.4%	20.9%	23.8%	10.6%	$8,507
Families with 18-24 year old dependents	17.5	15.6	15.7	13.5	22.5	15.4	8,187
United States							
Freshmen in public institutions	6.9	11.3	16.8	17.8	27.7	19.5	9,700
Families with 18-24 year old dependents	16.2	14.5	15.8	15.1	23.5	15.0	8,464

MCGUIRE (1976)	Family income: California, 1969 or 1971						
	$0-5,999	$6,000-8,999	$9,000-11,999	$12,000-14,999	$15,000-17,999	More than $18,000	Median
Pretax income of parents of all students (1971)	19.1%	14.7%	15.2%	14.3%	9.6%	27.1%	$12,048
Families headed by 35-60 year olds (1969)	13.2	11.4	21.0	18.3	11.0	25.1	14,219

Sources: Hansen and Weisbrod (1969): Table IV-7; Machlis (1973): Table 1; McGuire (1976): Table 1.

the implication of Hansen and Weisbrod's earlier comparison that low income families are underrepresented in California's public higher education system. It is also interesting to note that the same fraction of students came from families with incomes below $6,000 in both 1964 and 1971 (19.6 percent reported by Hansen and Weisbrod and 19.1 percent reported by McGuire for 1971) in spite of a drop from 44 to 24 percent of all families nationally in that category (U.S. Census Bureau, 1976). If the figures are correct, this suggests that public higher education in California has become increasingly successful at attracting low income students.[9]

Of these four comparisions of students and the populations from which they come, the Hansen and Weisbrod analysis basically compares the direct beneficiaries with the financial supporters of the public colleges and universities. Machlis' and McGuire's use of families having or potentially having college-age children shows whether college students are drawn from a different economic stratum than their nonstudent counterparts. The conclusion from Machlis' figures for the United States and New York City is that public college students are more affluent than their contemporaries, while McGuire reports the opposite to be true for California. Although it is possible that California really is different from the national pattern, perhaps on account of its extensive community college system, this contrast between the two findings probably stems from differences in the measure of income used.[10]

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[9]The family incomes in 1964 refer only to those students who were supported by their parents, while the 1971 income distribution applies to the parents of all students, independent and dependent. Hence if independent students tend to have lower parental incomes (as was suggested earlier), the Hansen and Weisbrod series would be biased upward relative to McGuire's and the real change would not be as pronounced as it appears.

[10]The Census Bureau reported for 1975 that families headed by 35 to 60 year olds had a median income of $16,432 (according to a March survey), that families with

B. Measuring Benefits

Turning now to the measurement and distribution of private benefits from public higher education, the methods employed in the literature can generally be classified either as looking at inputs into the educational process, in terms of dollars or resources spent, or as calculating the outputs of additional earnings or social mobility.

1. Input Approach. Within the literature using the input approach, benefits are measured in any of three ways: annual government subsidies to public institutions (on a per student basis), total institutional subsidies of a student throughout his period of enrollment, and annual institutional subsidies plus financial aid to students. Hansen and Weisbrod (1969) use both the first and second of these approaches. For the university system, the state colleges, and the community colleges of California, they calculate the "average costs of education" for an upper division student and for a lower division student in 1964-65. (See Hansen and Weisbrod, 1969, Tables III-1 to III-3). After subtracting the "amount borne by students and parents," they arrive at the average annual cost or subsidy "borne by California Taxpayers" for each type of student. When these annual subsidies are weighted by the appropriate attrition and

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[10](continued) 18 to 24 year old dependents who were full-time students had incomes of $16,389, while all families with 18 to 24 year old dependents had a median income of $12,680 (from an October survey). Because the March survey asks a number of questions about components of family income while the October survey only asks one, the Census Bureau found that October incomes are only 80 to 84 percent of the comparable March figures. When the income distribution of 35 to 60 year-old family heads was adjusted for this difference, their incomes were lower than those of the families with students (U.S. Census Bureau, 1976); calculations from the U.S. Census Bureau (1977); and figures for families with 18 to 24 year old dependents were obtained directly from the Census Bureau.

transfer rates for each type of institution and level of student, they obtain the "average total higher education subsidy" that a freshman entering in 1964-65 could expect to receive through the period he would be enrolled.

To show who receives the subsidies they have calculated, Hansen and Weisbrod then display the average single year subsidies (weighted by upper and lower division enrollments) and the average total subsidies by level of institution (reproduced here in Table 3). Since median family income as well as average subsidies (both single year and total) are higher at the universities than at the colleges, which in turn are higher than at the community colleges, and since "the average total subsidies ... rise far more sharply than the single year subsidies," Hansen and Weisbrod conclude that "(t)hese patterns of subsidies raise serious questions about the equity of the current system of financing public higher education in California (1969, pp. 70-71).

Hansen and Weisbrod make an important point about the educational opportunities enjoyed by students: In most respects (probability of attending any college, probability of attending a senior institution, probability of completing a degree, or even public dollars spent on a student's education), children from upper income families fare better than their low income counterparts. Similar evidence has been reiterated often.[11] To the extent that educational opportunity is considered as the likelihood of receiving a certain amount of higher education (even controlling for ability), it seems clear that the opportunities facing high income students are superior to those available to students from low income backgrounds.

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[11]For statistical evidence see, among other sources, Jerome Karabel, "Community Colleges and Social Stratification," Harvard Educational Review, November 1972, Table 6; Larry L. Leslie, Higher Education Opportunity: A Decade of Progress, ERIC/Higher Education Research Report No. 3, (American Association of Higher Education: 1977), Table 5; Humphrey Doermann, Toward Equal Access (unpublished, 1977), Table VI.

Table 3. Distribution of Benefits from Subsidies for Public Higher Education

HANSEN AND WEISBROD (1969)

Benefits per student from subsidies for public higher education and family income, by level of institution: California, 1964

	Average single year benefits	Average total benefits for period of enrollment	Median income
	(In dollars)		
University of California	1,700	4,870	12,000
State colleges	1,400	3,810	10,000
Junior colleges	720	1,050	8,800
All colleges	880	1,700	9,560

PECHMAN (1970)

Average subsidy per family in the state, by income class: California, 1964

	(In dollars)					
	0-3,999	4,000-5,999	6,000-7,999	8,000-9,999	10,000-13,999	More than 14,000
Assumption A[1]	56	122	129	126	175*	251*
Assumption B[2]	83	139	143	122	158*	205*

1. Assumes subsidy distributed on the basis of families with parent-supported students.
2. Assumes subsidy distributed on the basis of all families, including those with self-supporting students.

WINDHAM (1970)

Distribution of students and total subsidies for public higher education, by family income: Florida, 1967-68

	(In dollars)			
	0-2,999	3,000-4,999	5,000-9,999	More than 10,000
Total benefits*	6.3%	12.3%	42.6%	38.9%
Students	6.3	12.4	43.6	37.6

(continued)

Table 3. (Continued.)

MACHLIS (1973)

Distribution of benefits and students, by income class

California-1964

	(In dollars)					
	0-3,999	4,000-5,999	6,000-7,999	8,000-9,999	10,000-13,999	More than 14,000
Total benefits*	6.4%	12.9%	17.5%	16.4%	24.8%	22.0%
Students	6.6	13.0	17.6	16.4	24.6*	21.8*

New York-1968

	(In dollars)					
	0-3,999	4,000-5,999	6,000-7,999	8,000-9,999	10,000-14,999	More than 15,000
Total benefits*	6.6%	14.4%	20.8%	21.4%	25.2%	11.5%
Students	7.7	15.6	21.4	20.9	23.8	10.6

ZIMMERMAN (1973)

Total expenditures per full-time-equivalent student, by family income: St. Louis, 1969-70

	(In dollars)						
	Less than 3,000	3,000-4,999	5,000-6,999	7,000-8,999	9,000-11,999	12,000-14,999	More than 15,000
Expenditure per FTE	792	792	804	844	834	847	830

CREAN (1975)

Distribution of students (and distribution of benefits), by family income: Canada, 1961-62

	(In dollars)				
	Less than 3,000	3,000-4,999	5,000-6,999	7,000-9,999	More than 10,000
Students and benefits	14.5%	24.2%	22.8%	17.6%	20.9%

(continued)

Table 3. (Continued).

MCGUIRE (1976)

Average subsidies per student, distribution of total subsidies, and distribution of students, by income class: California, 1971-72

	(In dollars)					
	Less than 6,000	6,000-8,999	9,000-11,999	12,000-14,999	15,000-17,999	More than 18,000
Distribution of total subsidies*	23.5%	16.0%	16.3%	14.2%	8.8%	21.3%
Distribution of students	19.1	14.7	15.6	14.3	9.6	27.1

NEW JERSEY COMMISSION (1976)

Distribution of all state aid benefits[a/] and students, by income class: New Jersey, 1975

	(In dollars)						
	0-2,999	3,000-4,999	5,000-7,499	7,500-9,999	10,000-14,999	15,000-24,999	25,000 and over
Benefits*	6.3%	5.2%	7.4%	10.6%	26.4%	32.8%	11.4%
Students*	5.9	4.1	6.9	11.0	27.6	33.2	11.3

a. "All State Aid Benefits" includes state institutional and student assistance for public higher education in New Jersey.

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* Calculated from tables presented by the author.

Sources: Hansen and Weisbrod (1969): Table IV-8; Pechman (1970): Table 3; Windham (1970): Tables 5-7; Machlis (1973): Tables 1, 7, 10, and Hansen and Weisbrod (1969): Table IV-7; Zimmerman (1973): Table I; Crean (1975): Table 1; McGuire (1976): Tables 1 and 2; New Jersey Commission (1976): Tables 1, 2, 5.

Although few would dispute Hansen and Weisbrod's point on educational opportunities, they have often been criticized for basing their whole analysis on a classification of students by the level of institution rather than by income (as will be discussed further in Section V). Indeed, theirs is the only contribution to this literature that classifies in this way. As Machlis phrased it, "Weisbrod and Hansen (1969) are estimating the average income for different benefit levels and not the benefits at different income levels" (Machlis, p. 51).

Using the same 1964 California data, Pechman (1970) and Machlis distributed benefits according to income class rather than institutional level as Hansen and Weisbrod did. In terms of the average family in each income class in California (not just students), Pechman showed that benefits still rose with income, while Machlis' figures indicate that each income group received almost exactly the same share of total benefits as its share of students, even though low income students are more apt to attend a community college than more affluent students (see Table 3).

Machlis used the same technique with data on state and city expenditures for senior and community colleges in New York City. In this case, it appears that students from families with incomes over $8,000 receive slightly more benefits than their share of the student body, while students below $8,000 receive disproportionately fewer benefits.

Windham defined benefits in a similar way in his work on Florida except that he added federal support for public higher education to the state and local contributions. As Table 3 indicates, calculations from his distribution of benefits by income show that benefits are fairly evenly distributed among students, resulting from the extraordinarily similar income distributions that he reports for students at community and senior colleges.

These four studies assume that the benefits a student receives depend only on the level of institution he attends. With this assumption they have shown that even though less affluent students attend the lower level colleges that provide a lower cost education, the distribution of benefits among students follows fairly closely their representation in the aggregate student body of the higher education system. Crean (1975) simplifies the assumption even further since he assumes that the benefits from subsidies for higher education in Canada in 1961-62 have the same distribution over income classes as does the student body.

The assumption of constant benefits at a given type of institution has been questioned on two grounds: some students receive financial aid, and not all comparable colleges within a state system spend the same per student. McGuire's study reexamining California in 1971 and the New Jersey Commission's work in 1976 take account of this first source of variation in benefit levels. They both calculate benefits as state expenditures per student plus the average financial aid grant to students in each income class and level of institution.[12] With this specification, it is inevitable that benefits per student at each type of institution would fall as income rises (as long as financial aid is need-based). More interesting are the patterns of benefits for the system of

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[12]Because they exclude local government contributions from their basic measures of subsidies, particularly relevant for community colleges, McGuire's and the New Jersey Commission's estimates of benefits to low income students are biased downwards compared to the other studies that combine state and local support. McGuire also includes federal student aid of an unspecified amount. The New Jersey Commission presented tables that included federal student aid as well, but it seemed more useful for the discussion here to maintain the focus on state policies as much as possible.

public higher education as a whole, shown in Table 3.[13] In both cases, students from families in the lower income categories receive more than their share of subsidies, while students in the upper brackets generally less than their share. Hence, when student aid is included in the analysis, the benefits of public subsidies are slightly more concentrated at the lower part of the income spectrum than are students.

Zimmerman introduces another source of variation in benefits per student -- different levels of spending among similar institutions. At the three community colleges he studied in St. Louis for 1969-70, current operating expenditures per full-time equivalent (FTE) student range from $732 to $881, with low income students being concentrated at the low-spending campus. Consequently, even when financial aid is included, he finds that total expenditures per FTE rise with income. Zimmerman's way of measuring subsidies is the best of those studies that take the input approach to the benefits of public higher education. Clearly, he was fortunate to have information on the student income distribution at individual campuses when it is difficult to find such data even by state. His findings, however, emphasize the importance of generating better income data so that future studies need not ignore the variation in benefits among similar institutions.

2. Output Approach. The basic difference between the input and output approaches is that the former measures benefits according to the value of the government subsidies given students, while the latter measures them as the value to the student of the outcomes they produce. Students receive

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[13]The figures here were not presented by McGuire or the New Jersey Commission but are easily calculated from their tables. The New Jersey Commission included state aid to the private sector in its analysis, but that component of support is excluded in this paper. The distribution of benefits in New Jersey apparently applies to academic year 1974-75, but that is not stated explicitly in the report.

higher lifetime incomes and higher occupational status from both public and private higher education, in addition to "psychic income" or other unquantifiable benefits.

Because of the conceptual as well as technical problems in predicting future income, the empirical estimates of the distribution of lifetime benefits from public higher education are fairly rudimentary. Many estimates have been made in the human capital literature of the additional income that results from some college or from a college degree (See, for instance: Becker, 1975; Freeman, 1976; and Taubman and Wales, 1974). Hansen and Weisbrod (1969) also calculate the present value of the additional lifetime income that a recent high school graduate in California could expect in 1965 if he received one to three years of a college education (with no distinction between the public and private sectors) and, alternatively, if he graduated from college, after the additional taxes he would have to pay (1969, pp. 21-31). Pechman and Conlisk espouse the output approach to measuring the benefits of public higher education, but offer nothing empirical.

While estimates such as Hansen and Weisbrod's provide useful indications of the average value of higher education to a student, they are silent on the distribution of such benefits, necessary information for a discussion of equity. Presumably the benefits vary with student as well as institutional characteristics. Because of data limitations, the only variation in lifetime benefits that Hansen and Weisbrod -- or most of the human capital literature -- recognize is by sex and by amount of college completed. Knowing variation in lifetime benefits by level of institution attended would be an improvement. Better still would be a suggestion offered by Hartman (1972) of estimating the distribution of income throughout life for a cohort of high school seniors by

family income at high school. This estimate would take into account differential probabilities of attending college, of attending various types of college given the decision to attend at all, and of dropping out before receiving a college degree. Although Hartman only simulates this distribution on the basis of hypothetical but reasonable estimates of the parameters, it might be possible to improve upon his calculations with some of the longitudinal data that have recently or will soon become available -- such as the National Longitudinal Surveys of Work Experience of Young Men (the Parnes data) or the National Longitudinal Survey of the High School Class of 1972 -- if they identify the type of college attended as well as the number of years.

IV. THE COSTS OF PUBLIC HIGHER EDUCATION

The process of determining who bears the costs of public subsidies for higher education is fairly straightforward and there is little variety in the methods employed in the empirical literature. The costs are uniformly considered to be the government funds devoted to the educational process, in particular the annual amount of state and local (and sometimes federal) tax revenues spent on public higher education. It is also clear that taxpayers bear the financial burden for these subsidies. This simplicity should not be confused, however, with certainty about who pays the costs.

In all of the empirical studies, the first step is an estimate of the incidence of the taxes that are available for spending on higher education. The authors either rely on incidence studies conducted by others[14] or calculate their own distributions of effective tax burdens by combining published

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[14]Windham, Machlis (for his New York City taxes), Crean and the New Jersey Commission use this method.

information on tax payments by income class with assumptions on the shifting of taxes gleaned from the literature on tax incidence.[15] Although there are few taxes for which a consensus has been reached on who bears the burden, only Zimmerman presents estimates of tax payments under alternative assumptions. State and local tax incidence is particularly sensitive to the assumptions made. While federal taxes remain progressive (though to varying degrees), state and local taxes can range from slightly progressive to clearly regressive depending on the assumptions (Pechman and Okner, 1974, Table 4-10).[16] Once an effective tax rate has been chosen for each income class, total tax payments can be calculated for each family or income class.

The next step toward distributing the financial burden for public support of higher education is to decide how much of each family's or individual's tax payments should be allocated to higher education. Hansen and Weisbrod assert that they "...have no real way of determining how much of whatever taxes are paid reflect support for higher education, as against the many other services provided by state and local governments" (1969, p. 74). Hence, they look only at total tax payments per family in different income classes. A simple and logical alternative, used implicitly or explicitly in all of the other studies, is to assume that the same share of each tax payment goes toward higher education as higher education expenditures comprise of the relevant total tax revenues. Theoretically, the burden should be allocated according to the marginal taxes associated with financing higher education.

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[15] Hansen and Weisbrod (1969), Pechman, Zimmerman, and Machlis (for his state taxes) fall into this category. McGuire's study contains no cost side.

[16] See also Chapter 3 for a good discussion of alternate tax incidence assumptions.

This would most accurately reflect the distribution of the burden due to higher education, or alternatively, the distribution of the tax relief that would result if suddenly the public sector removed its subsidy of public higher education. Lacking a controlled experiment, it is impossible in practice to estimate the marginal tax rates associated with higher education, to know whose taxes would rise or fall by how much with a change in the level of public subsidies (except perhaps in the special case of community college districts that raise taxes only for the college). Moreover, increased spending on higher education could come from newly imposed taxes, from the natural growth in revenues from rising incomes, or from reduced spending on other programs, as well as from raising existing rates. Therefore, assuming that all taxpayers pay the same average fraction of their taxes for higher education is as good an assumption as any without further information.

Finally, by combining information on tax incidence by income class with the share of individual taxes to be allocated to higher education, it is possible to calculate either the tax payment for higher education per family in each income class (as do Hansen and Weisbrod, Pechman and Zimmerman) or the share of all tax payments for higher education that each income class pays (as Machlis, Windham, Crean, and the New Jersey Commission do). Their results, except for Windham's, are shown in Table 4.

Windham's distribution of costs is not repeated here because it is seriously flawed by an apparent technical oversight that points up the importance of choosing information on tax burdens that is comparable to the benefit data. The New Jersey Commission's work can be criticized on similar grounds but its error was not as extreme as Windham's. Windham used 1960 and 1961 data on the fraction of total taxes paid by each income class to distribute the cost of public higher education in Florida in 1967-68. The

Table 4. Tax Burdens by Income Class

HANSEN AND WEISBROD (1969)

State and local tax burden: California, 1965

	$0-3,999	$4,000-5,999	$6,000-7,999	$8,000-9,999	$10,000-13,999	More than $14,000
Effective state and local tax rate	23.7%	10.5%	8.2%	7.7%	7.6%*	7.5%*
Total state and local taxes per family	$474	$527	$576	$696	$879*	$1,911*

PECHMAN (1970)

Average state and local tax payment for public higher education: California, 1965

	$0-3,999	$4,000-5,999	$6,000-7,999	$8,000-9,999	$10,000-13,999	More than $14,000
Tax payment per family	$66	$77	$88	$112	$154*	$432*

ZIMMERMAN (1973)

State and local tax payments per family for three community colleges: St. Louis, 1968

	Less than $3,000	$3,000-4,999	$5,000-6,999	$7,000-8,999	$9,000-11,999	$12,000-14,999	More than $15,000
With incidence based on:							
Current income	$4.63	$6.55	$7.29	$8.74	$10.45	$11.43	$18.16
Permanent income	1.27	4.05	5.76	8.07	11.15	13.57	24.04

MACHLIS (1973)

Effective tax rates and distribution of tax payments: New York City, 1968

	Less than $4,000	$4,000-5,999	$6,000-7,999 [a/]	$8,000-9,999 [a/]	$10,000-14,999	More than $15,000
Effective rate:						
New York City taxes	10.2*	6.5*	6.0	5.5	5.1	6.6
New York state taxes	5.7*	6.0*	6.0	5.7	6.2	9.3
Distribution of taxes paid (in percent):						
New York City payments	6.5	7.9	10.3	10.2	23.6	41.5
New York state payments	3.5	6.1	8.7	8.5	24.1	49.1

a. For the effective tax rate only, these income classes are $6,000-7,499 and $7,500-9,999.

(continued)

Table 4. (Continued)

CREAN (1975)

Distribution of tax payments for higher education by age of individual or family head: Canada, 1961-62

	$0-2,999	$3,000-4,999	$5,000-6,999	$7,000-9,999	More than $10,000	Total
			(Percent)			
Age						
Under 35	11.1	29.4	30.3	15.8	13.4	100.0
35-44	4.9	18.1	27.7	23.9	25.4	100.0
45-54	6.1	16.4	21.3	21.2	35.0	100.0
55 and over	21.3	17.1	15.6	15.9	30.1	100.0
Total	11.0	20.2	23.7	19.2	25.9	100.0

NEW JERSEY COMMISSION (1976)

Effective tax rates and distribution of tax payments: New Jersey

	$0-2,999	$3,000-4,999	$5,000-7,499	$7,500-9,999	$10,000-14,999	$15,000-24,999	$25,000 and over
Effective state tax rate	4.9	5.6	5.1	4.9	4.8	4.5	2.6
Share of total taxes paid	1.1	3.0	11.3	17.2	32.1	26.8	8.4

* Estimated from author's figures, assuming an even distribution of taxpayers within income classes.

Sources: Hansen and Weisbrod (1969): Table IV-11; Pechman (1970): Table 3; Zimmerman (1973): Table II; Machlis (1973): Tables 5 and 6; Crean: Table 1; New Jersey Commission (1976), Table 7.

main problem is that he made no adjustment for inflation (the Consumer Price Index had risen about 12 percent) and, more importantly, for the general growth in real incomes of about 30 percent. Hence, because a smaller fraction of the population fell below any given level of income in 1967-68 than in 1960-61, Windham's use of a 1960-61 tax burden distribution grossly overestimates the 1967-68 higher education costs attributable to low income taxpayers and underestimates the amount carried by the more affluent. Similarly, the New Jersey Commission combined a student income distribution presumably for 1974-75 with a distribution of tax payments apparently for 1971. (The tax data come from a study dated 1972.) This three year difference would lead to the same type of bias as in Windham's study, but the effect would not be as extreme. Hence, the New Jersey Commission's figures are included in Table 4 while Windham's are not.[17]

V. COMBINING COSTS AND BENEFITS OF PUBLIC SUPPORT OF HIGHER EDUCATION

The appropriate way to combine the costs and benefits of public support for higher education depends on the question being asked. The majority of studies in the literature focus on the current redistributional effects of

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[17] Appendix A (available from the author on request) attempts to correct this oversight in these two works. For the Florida study, the distribution of costs is reestimated, first using 1966 tax information under two different sets of incidence assumptions, and secondly simply adjusting the tax burdens by income class to reflect inflation and the general growth in incomes. In all cases, the higher education cost attributable to the lowest income class is reduced by at least one-third, compared to Windham's estimates, while the burden placed on the highest incomes more than doubles. For the New Jersey Commission, the distribution is recalculated using U.S. income distributions for 1974 and 1975, assuming that families in each class paid the same effective New Jersey tax rate as reported by the Commission for 1971. The main shift in the cost burden is from middle income families to upper income groups.

net subsidies. This leads them to adopt a current "net benefit" approach. In the process, they either ignore the intergenerational transfer of resources (the fact that the generation that pays for higher education is not the one that receives it) or they assume that parents benefit from their children's education sufficiently to consider the family as the unit that both benefits and pays (See Crean, footnote 1).

An alternative concern is whether the effects of the program, not just the subsidies for higher education, are equitable. How do public subsidies for higher education affect the lifetime distribution of income? Some (most notably Pechman) feel that the problem of intergenerational transfers makes the question intractable and that the benefits and tax burdens should be examined separately to determine whether each is distributed in a desirable manner. Alternatively, Conlisk holds that at least theoretically the effects of these intergenerational transfers could be measured and any resultant shifts in the distribution of income could be determined. This section describes in more detail the various methods employed and the conclusions reached on the distributions of net benefits and lifetime income.

A. The Net Benefit Approach

Although examining the current distribution of subsidies avoids the difficult problem of intergenerational transfers, the net benefit approach must still decide how to handle tax payments for public higher education made by those who are not currently using the system, the nonusers. Unavoidably, the main transfer of resources in any year is from nonusers to users.

Hansen and Weisbrod and Zimmerman circumvent the user/nonuser problem in similar ways by focusing on users and looking at individual student net benefits, the excess of what a given student receives in benefits over what his family pays in taxes. One difference between the two studies is that,

as was discussed in the previous section, Hansen and Weisbrod prefer not to allocate a specific portion of a family's tax payments to higher education since they maintain that they cannot estimate the marginal tax payment associated with the subsidies. Hence, their measure of "net transfer" equals the per student subsidy at each level of institution in California minus the total state and local taxes paid by the family with median income for that type of institution (See Table 5). They find that the average family at each level of institution receives more in benefits than it pays in total state and local taxes. This results in a net transfer from families without children in the California system of higher education to the family of the average student at all levels of institution, and the size of the net transfer is greater at the higher level institutions (where family income also tends to be higher).

There are two serious problems with Hansen and Weisbrod's approach to net benefits. First they classify students by type of institution rather than by income. They chose this method because they were interested in describing who is receiving what benefits according to variables that can most readily be affected by policy -- namely, eligibility and subsidy levels for different types of institutions -- since "the magnitude of higher education subsidy received depends primarily on the system attended rather than directly on family income" (Hansen and Weisbrod, 1971). They consider their format as not just "...(descriptive of) what has happened in the past, but (predictive of) what would happen if some particular policy action were taken" (Hansen and Weisbrod, 1971, p. 5). As they point out, there are a number of "useful ways" to classify people. But if they want to combine the benefit structure with the tax system, their approach seems incomplete, particularly since tax payments vary so widely between the lowest and highest income classes:

Table 5. Net Benefits

HANSEN AND WEISBROD (1969)

Families by presence or absence of children in California public higher education, 1964

	Without	With		
		All	Junior college	State college	University of California
	(In dollars)				
Average family income	7,900	9,560	8,800	10,000	12,000
Average subsidy	0	880	720	1,400	1,700
Average state and local taxes	650	740	680	770	910
Net transfer	-650	+140	+40	+630	+790

ZIMMERMAN (1973)

Net subsidy per full-time equivalent student in 3 community colleges by family income: St. Louis, 1969-70

Tax subsidy per FTE	Less than 3,000	3,000-4,999	5,000-6,999	7,000-8,999	9,000-11,999	12,000-14,999	More than 15,000
	(In dollars)						
Based on current income	499	497	509	547	536	548	524
Based on permanent income	503	500	510	548	535	545	518

PECHMAN (1970)

Net subsidy (+) or net tax (-) for the average family by income: California, 1964

	0-3,999	4,000-5,999	6,000-7,999	8,000-9,999	10,000-13,999	14,000-19,999	More than 20,000
	(In dollars)						
Assumption A 1/	-10	+45	+41	+14	+21*	0	-449*
Assumption B 2/	+17	+62	+55	+10	+4*	-48	-491*

1. Assumes subsidy distributed on the basis of distribution of families with parent-supported students.
2. Assumes subsidy distributed on the basis of all families, including those with self-supporting students.

Table 5. (Continued.)

MACHLIS
(1973)

New York, 1968	Net gain: total per income class and average per family					
	(In dollars)					
	0-3,999	4,000-5,999	6,000-7,999	8,000-9,999	10,000-14,999	More than 15,000
Total net gain (in thousands)	2,711.3	13,020.9	19,985.9	21,238.8	2,495.4	-59,452.1
Average per family	8	43	65	83	5	-199

California, 1964	Net gain: total per income class					
	(In dollars)					
	0-3,999	4,000-5,999	6,000-7,999	8,000-9,999	10,000-13,999	More than 14,000
Total net gain (in thousands)	-6,517.5	+25,196.2	+30,296.6	+10,026.2	+15,536.9	-74,538.4

NEW JERSEY COMMISSION
(1976)

	Net benefits from all state aid for public higher education: by family income, New Jersey						
	(In dollars)						
	0-2,999	3,000-4,999	5,000-7,499	7,500-9,999	10,000-14,999	15,000-24,999	25,000 and over
Total ($1,000's)*	9,818	4,117	-7,432	-12,408	-10,730	11,227	5,597
Dollars per taxpayer*	26.33	18.96	-24.56	-36.22	-18.23	26.43	41.87
Dollars per student*	1,402	1,617	1,327	1,166	1,150	1,164	1,185

* Estimated from author's tables.
Sources: Hansen and Weisbrod (1969): Table IV-12; Zimmerman (1973): Table II; Pechman (1970): Table 3; Machlis (1973): Tables 7 and 10; New Jersey Commission (1976): Tables 1, 2, 5, 11, 17.

average University of California benefits exceed the community college subsidy by less than $1,000, while the rich pay nearly $4,000 more in state and local taxes than the poor (Hansen and Weisbrod, 1969, Tables IV-11 and IV-12). Indeed, if they had calculated the "net transfer" for the average student in each income class, weighted by enrollment at each level of institution, they would have seen a very favorable pattern: subsidies for the average student exceed total California taxes most in the lowest income class, while over $14,000 in income, taxes exceed the higher education subsidy for the average student. (See Table 6, column 3.) Though it may be merely descriptive rather than predictive, the distribution of net benefits by income class (and perhaps by type of institution) seems important information for understanding the effect of the current tuition subsidies, if one is taking a net benefit approach.

In addition, Hansen and Weisbrod have often been criticized for creating a misleading impression with their measure of net transfer, even though they contend that their approach is "...less likely to be misleading,...that a comparison of benefits from higher education with the taxes paid 'for higher education' may lead readers to a quick judgement regarding the 'equity' of the balance" (1971, p. 370). In spite of their protests, their measure of net transfer still seems inappropriate. Since they chose not to allocate any particular part of family tax payments to higher education, they should not try to net out costs and benefits. Rather, they should focus separately on the tax system (that they found regressive) and on the benefit structure (that they found favors the rich), not on a single measure for the whole system.

As with Hansen and Weisbrod, Zimmerman focuses on the net benefit to an individual student or family. From the benefits that the student receives in each income class, he substracts the taxes that each family with a community

Table 6. Benefits, Taxes, and "Net Transfer" for the Average Student, by Income Class: California, 1964

Family income	Benefit per student	State and local taxes per family	"Net transfer" per student	Benefit minus taxes for higher education
	(1)	(2)	(3)	(4)
$0-3,999	$859	$474	$385	$793
4,000-5,999	863	527	336	786
6,000-7,999	896	576	320	808
8,000-9,999	926	696	230	814
10,000-11,999	968	833	135	826
12,000-13,999	1,012	984	28	837
14,000-19,999	1,002	1,228	-226	773
20,000-24,999	1,045	1,758	-713	697
25,000 and over	1,045	4,093	-3,048	71

Sources

Column 1: Weighted average benefit of families with students in California public higher education. Calculated using income distribution of families with students at different institutional levels (Hansen and Weisbrod, Table IV-7), average subsidy per level of institution (Hansen and Weisbrod, Table IV-12), number of families by level of institution (Pechman, p. 365, note 6).
Column 2: Hansen and Weisbrod, Table IV-11.
Column 3: Column (1) minus Column (2).
Column 4: Benefit per student (Column 1) minus state and local taxes allocated to higher education (Pechman, Table 3).

college student pays toward the support of the three colleges. He finds that the resultant net benefits are highest for middle income families. (See Table 5.)[18]

Instead of calculating the net benefits separately for users and nonusers (or ignoring nonusers completely), an alternative approach estimates the total net benefits accruing to or flowing from each income class either as a whole or for the average family in each class, showing who is subsidizing whom (in terms of income). Essentially, this method compares each income class's share of total benefits with its share of total costs. One objection to this "taxpayer net benefits" approach is that at the low end of the income spectrum, it aggregates a few families receiving large benefits with many families receiving none, and thus hides the variance in benefits levels (Hansen and Weisbrod, 1971, footnote 8).

Pechman, Windham, Machlis, Crean, and the New Jersey Commission all adopt this approach, though with a few slight differences: Pechman looks only at net benefits per taxpayer in each income group and Windham only at total net benefits per income class; Machlis presents both total and per taxpayer net benefits; Crean only discusses the distribution over income classes of total benefits (actually, enrollment) and total tax payments; and the New Jersey Commission displays total net benefits, net benefits per family in the income class, and net benefits per student. The results for Pechman, Machlis, and the New Jersey Commission are shown in Table 5.[19]

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[18]Interestingly, this is the same conclusion that would appear in the 1964 California data by subtracting Pechman's series of tax payments per family (Table 4) from the estimates of subsidy per student (Table 6). See Table 6, column 4.

[19]Crean simply compares the distribution of students by family income (shown already in Table 3) with the distributions of tax payments by age and income (shown in Table 4).

Three of these five taxpayer net benefit studies report subsidies for public higher education that redistribute income from upper to lower income classes: Pechman, Machlis, and Crean. Windham concludes the exact opposite, but his results can be explained (and put aside) because, as discussed earlier, his use of a tax burden for 1961 and a benefit distribution for 1968 severely distorts his analysis. Indeed, when his tax data are adjusted to be comparable with the benefits, his findings are reversed and a substantial redistribution appears from rich to poor. (See Appendix A, available from the author.) The New Jersey Commission reports a redistribution from middle income to both low and high income classes. This study also suffers the same weakness as Windham's work, but the effect is not as strong. Nevertheless, when more appropriate estimates of the tax distribution are used, the redistribution flows from the upper brackets to the low and middle income classes (See Appendix A).

The main finding to emerge from this examination of the net benefit studies is that subsidies for public higher education appear to redistribute income from upper to lower income groups. When Windham's and the New Jersey Commission's figures are revised, the studies employing a taxpayer net benefit approach unanimously indicate a "good" redistribution of income. Similarly, when Hansen and Weisbrod's net transfer measure is calculated for the average student at each income level rather than at each type of institution, the evidence again suggests a favorable redistribution. Only when net benefit is measured on a per student basis as the benefit minus taxes allocated for

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[19](continued) As was noted in the previous section, Windham's distribution of the costs of higher education is seriously flawed. Hence, there is no point in repeating his net benefit figures either. Although the calculations by the New Jersey Commission have similar problems, they did not seem severe enough to warrant exclusion from Table 5.

higher education (both in Zimmerman's study and when Hansen and Weisbrod's 1964 California data are used) does the conclusion change somewhat. From that perspective, the subsidies benefit the middle income students slightly more than upper or lower class students.

B. The Distribution of Lifetime Income Approach

Even though Pechman made a significant contribution to the net benefit approach, he agrees with Hartman (1970) that it is not the best way to understand the distributional impact of public subsidies to higher education. He maintains that, "The real question is whether public higher education makes the distribution of lifetime incomes of the recipients of its benefits and of society in general more or less equal" (Pechman, p. 368). Indeed Hansen and Weisbrod share this view (1971, footnote p. 364). They disagree, however, on whether the net benefits approach provides useful information in the absence of direct evidence on lifetime incomes, with Pechman asserting that "this distribution is not even remotely related to the lifetime income distribution needed to establish the distributional effects of the subsidy" (p. 368), and Hansen and Weisbrod holding that "until evidence is obtained, however, we see no justification for assuming, as Pechman seems to suggest, that the income distribution of subsidies is either uncorrelated or negatively correlated with subsequent changes in the life-time distribution of earnings" (1971, footnote 3). Pechman essentially wants an intergenerational general equilibrium analysis that would include information on rates of return to higher education by income, on what the income distribution would be in the absence of higher education subsidies, and on alternate uses to which the public funds could be put. Hansen and Weisbrod imply that a partial equilibrium analysis, just looking at the annual subsidies, would at least indicate the correct direction of the redistribution.

To resolve these contrasting positions, Conlisk develops an intriguing simultaneous equation model of intergenerational changes in the distribution of income. Basically, a child's lifetime income depends on the lifetime income of his parents after taxes and after they have paid for his higher education, as well as on the amount of higher education that both he and his parents receive, and on a random disturbance term. At the same time, parental after-tax income is related to the amount of higher education subsidies society provides. Although Conlisk's model is unable to determine the effect of changes in tuition subsidies on a measure of the equality of the distribution of incomes, he is able to show that the net benefit approach does not "provide a reliable indicator of the equity effects of tuition subsidies for higher education" (1977, p. 160). In some examples that he concocts, the net benefit and equity measures move in the same direction, while other times they conflict.

VI. SUMMARY AND IMPLICATIONS

What, then, do these studies show about the equity of public subsidies for higher education? First, none succeeds in determining the most important and interesting effect of the subsidies -- their impact on the distribution of lifetime incomes. Indeed, Conlisk's model shows that a favorable distribution of net benefits would not necessarily imply that the subsidies have an equalizing effect on the distribution of lifetime incomes. Second, in terms of the current effects, the studies give the impression that net benefits (subsidies received minus taxes paid) redistribute income in a desirable fashion: there is more evidence of a transfer from rich to poor than the reverse. Third, the technical validity of the net benefit calculations themselves is questionable because of the accuracy and comparability problems with the income data noted earlier. The fact that using more timely information

on income to estimate the distribution of the tax burden reversed the conclusions of the studies by Windham and the New Jersey Commission underlines the critical importance of choosing data carefully. Economists are used to settling for approximations of their desired data series, but in net benefit calculations where the results are so sensitive, mismatched data are worse than none.

A more fundamental problem with net benefits calculations is that a "good" distribution of net benefits can mask an inequitable provision of educational opportunities, and a "bad" distribution can arise from equitable circumstances. The goal of any measure of equity, of course, is to distinguish consistently and correctly "equitable" situations from "inequitable" ones. Since equity is a normative concept, there is no one right definition. Still, a summary measure must give an answer that is consistent with our sense of equity in simple cases where the judgement is obvious, before we can trust it in ambiguous instances. Unless equity for higher education subsidies is defined as the redistribution of income from rich to poor, the following two examples show that the distribution of net benefits is not a trustworthy measure of equity. In the first case, it pronounces a situation that could reasonably be considered equitable to be inequitable, while in the second case, the opposite occurs.

Example 1. Consider a state where there are two distinct groups of taxpayers, the young and the old, distributed across income classes as shown in Table 7. All of the old group, and none of the young, receive benefits from the subsidies (i.e., have family members attending college) this year, while next year all of the young group is assured of receiving benefits. The subsidies for higher education are raised through progressive taxation of all households. They are distributed among students progressively

(as shown in the table) with low-income students families receiving higher subsidies than their more affluent counterparts, perhaps because of a substantial need-based student aid program. To me, this seems like an eminently equitable subsidy. Since the net benefit calculation shows a redistribution of income from lower to higher income classes, however, it would deem this system inequitable. The largest redistribution occurs between young and old taxpayers, but no subsidy raised through a general tax can avoid this transfer. Hence, this example illustrates how the life cycle of income and college enrollment patterns can cause a redistribution of income from low to high income classes in spite of an equitably raised and distributed higher education subsidy. It seems inappropriate to conclude that the subsidies are vertically inequitable because of unavoidable horizontal inequities.

Example 2. Consider another state that supports higher education through regressive taxes and that confers greater benefits on students (or potential students) from high than from low income classes. Table 8 shows an example of such a situation. In spite of the anti-poor taxes and anti-poor benefit structure, it is quite possible that the net benefits would indicate redistribution of income in the desired direction, from rich to poor. This is possible because under most regressive taxes, higher income families have larger tax bills than their low income counterparts simply because the former earn more money. To accept the implication of the net benefit calculations in this instance would mean that two wrongs can make a right and would reflect a low standard for equity. After all, it seems that educational subsidies that help correct society's maldistribution of current income but that do not equitably provide educational opportunities should not be deemed "equitable."

Table 7. Example 1: Progressive Taxes, Pro-Poor Benefits, Old and Young Families, "Bad" Net Benefits

	Family Income[a]				
	$10,000	$15,000	$20,000	$25,000	Total
1. Number of young families	50	30	15	5	100
2. Number of old families	5	15	30	50	100
3. Tax rate	1.0%	1.1%	1.2%	1.3%	---
4. Benefits per old family	$520	$460	$420	$390	---
	(thousands of dollars)				
5. Total income for all families	550	675	900	1,375	3,500
6. Total tax payments	55.00	74.25	108.00	178.75	416.00
7. Total benefit payments	26.00	69.00	126.00	195.00	416.00
8. Total net benefits	-29.00	-5.25	+18.00	+16.25	0

Rows 1-4: Hypothesized.
Row 5: Rows 1 and 2 times family income of the class.
Row 6: Row 3 times Row 5.
Row 7: Row 2 times Row 4.
Row 8: Row 7 minus Row 6.

a. Family income = mean income for the class.

Table 8. Example 2: Regressive Taxes, Anti-Poor Benefits, and "Good" Net Benefits

	Family Income[a/]				
	$10,000	$15,000	$20,000	$25,000	Total
1. Number of families	50	50	50	50	200
2. Benefits per family	$130	$160	$170	$180	---
3. Tax rate	1.1%	1.0%	0.9%	0.8%	---
	(thousands of dollars)				
4. Total income for all families	500	750	1,000	1,250	3,500
5. Total tax payments	55	75	90	100	320
6. Total benefits	65	80	85	90	320
7. Total net benefits	+10	+5	-5	-10	0

Rows 1-3: Hypothesized.
Row 4: Row 1 times family income.
Row 5: Row 3 times Row 4.
Row 6: Row 1 times Row 2.
Row 7: Row 6 minus Row 5.

a. Family income = mean income for the class.

These two examples suggest a number of points on the equity of subsidies for public higher education.

1. The usefulness of the net benefit approach is limited. Under ideal conditions (specifically, if the technical problems involved in calculating net benefits could be overcome and the question of which tax dollars go to higher education subsidies could be resolved, as in some community college districts), the distribution of net benefits might accurately describe the effect of higher education subsidies on the income distribution of the general population. As part of an overall examination of the distributional effects of public programs (as in Reynolds and Smolensky, 1977) this might be interesting, but the independent importance of any such conclusion about the distributional impact of higher education subsidies would be limited because much of any redistribution occurs among generations and between users and nonusers within income groups. Although matching the costs and benefits of the subsidies within income groups is intuitively very appealing, it provides little useful information on the equity of public support for higher education unless the definition of equity is explicitly proclaimed to be the effect on the current distribution of income.

2. The distributional impact does not make a subsidy pattern seem equitable or inequitable, I would argue, though in a given situation, a transfer from rich to poor would be preferable to the reverse. Rather, whether the general population is treated fairly in raising the taxes (generally with progressive or perhaps proportional taxes) and whether the subsidies work to equalize educational opportunities for actual and potential students seem to be more important questions. Hence, as critics of the net benefit approach have proposed before, a preferred method for examining the equity of higher education subsidies is a separate evaluation of the distribution of taxes.

and benefits. This has the further advantage of avoiding most of the technical and conceptual problems that mar net benefit calculations, including the lack of comparability between income measures used in tax and benefit studies, imputing direct benefits to nonusers, the intergenerational transfer and the question of which tax dollars go to higher education. Unfortunately, this approach has no way of judging whether an equitable benefit pattern may more than compensate for an inequitable tax burden. Such a balance has to be made by policymakers.

3. There is no single, straightforward set of criteria for evaluating (or defining) educational opportunity but many pieces of evidence can contribute to a general impression. Suggestions from the literature include: attendance rates in general and at different institutional levels in particular that are approximately even over the income distribution; subsidies received that at least do not rise much with income and perhaps move inversely with income; subsidies that make the financial barriers to higher education no more difficult for low income than high income students to overcome. Nonfinancial policies also affect educational opportunities. Open admission undoubtedly attracts more low income students but does it raise or lower the average educational attainment of high school graduates? A similar question can be asked about community colleges in particular -- do they increase the consumption of higher education by low income youth, or by depressing aspirations do they make the educational attainment and consumption of subsidies more unequal? Analysts could improve the reliability of information on student and nonstudent income distributions, but policymakers need to choose among these and other interpretations of educational opportunity the goal that they would like their state's subsidies to achieve and then evaluate their financing patterns in that context.

Once analysis has determined how the current subsidy structure fares in equalizing educational opportunities, the next step is to compare this result with alternate financing methods. This is the relevant policy question: on equity grounds, how do the current tuition subsidies compare with no subsidies for public higher education, with subsidies based exclusively on student need, with continued institutional subsidies coupled with more extensive student-based aid, or with other possible options? To answer this question, more evidence needs to be collected on the alternatives. For example, the expected distribution of benefits under a new program should not just be based on those who would be eligible for them, but also on a better understanding of the role of price and student aid packaging on the attendance and retention decisions of students. Work currently being done with the National Longitudinal Survey of the High School Class of 1972 is moving in this direction. The fears of low tuition advocates that higher tuitions would not be accompanied by sufficient student aid warrant investigation. It is possible that "(l)ow tuition...is a far more stable guarantee of educational opportunity" than relying on student aid (Financing Postsecondary Education, 1974, p. 180). The recent experience of instituting tuition at the public colleges in New York City accompanied by student eligibility for state scholarship aid would be instructive.

The main points of this paper can be summarized in the context of the debate over low tuition. Many of the studies on the net benefits of subsidies for public higher education have been used as fuel for the low tuition debate, generally on the "raised tuition" side. This paper has good and bad news for low tuition advocates. On the good side, it has shown that existing evidence, poor though it tends to be, supports the position that tuition subsidies do seem to redistribute current income from upper to lower income

classes. It goes on to emphasize, however, that the validity of this evidence must be questioned due to severe technical and conceptual problems. Furthermore, the redistributional impact of low tuition (or other forms of subsidies) does not appear to be a very useful indicator of the equity of this method of finance. A preferred approach would evaluate the tax and benefit sides separately, judging the tax system on its progressivity (or lack thereof) and the benefit side on its success in providing equal educational opportunities.

The bad news for low tuition supporters is that it does not seem to have achieved equality of opportunity (interpreted as independence between family income and the consumption of a given amount of higher education),[20] though undoubtedly it has accomplished much more in this direction than would no subsidies for public higher education. The most important tests for the equity of current subsidies would come in a comparison with alternative financing schemes. More information needs to be gathered on the practical effect of those alternatives on educational opportunities before an informed comparison can be made.

Whatever is determined about the equity of current or proposed subsidies for public higher education, it should be stressed again that equity must be balanced with efficiency. Others share Hansen and Weisbrod's skepticism on public benefits from higher education in the absence of clear evidence of the existence and magnitude. Strong believers in the social good flowing from higher education would bolster their case for continuing universal low tuition, regardless of the equity debate, by addressing the question of external benefits as clearly, objectively, and as empirically as possible.

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[20] See the discussion and references in Section II, part B.

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